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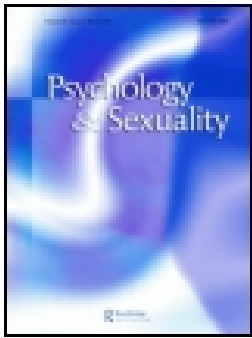
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LGB+ and heterosexual-identified people produce similar analogies to intersex but have different opinions about its medicalisation

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ABSTRACT

Qualitative researchers have long observed that rationales for medical interventions on intersex characteristics, or *variable sex characteristics* (VSC), invoke heteronormative ideals. Such medical interventions are controversial and described as infringing human rights. Recent survey research has confirmed that support for medical intervention, and opposition to its legal limitation on human rights grounds is predicted by (1) identifying as heterosexual and (2) endorsing gender binary beliefs. We replicated both findings here among 59 LGB+ and 61 heterosexual participants. Opinions about medical interventions on intersex characteristics were additionally predicted by belief in *heterosexual complementarity* among all participants, and by strength of *heterosexual identification* among heterosexual-identified participants. Participants read excerpts from three published interviews with a medical professional, a parent of a child with intersex characteristics, and an adult with intersex characteristics and generated analogies to these experiences. Participants who generated more diverse analogies endorsed the gender binary and medical interventions less, and supported legal limitations more. The results are discussed in relation to the formation and distribution of public attitudes to the controversial medicalisation of intersex characteristics.

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Intersex; variable Sex Characteristics; gender Binary Beliefs; heterosexual Orientation

Intersex characteristics are physical characteristics that vary from normative or typical definitions of how male or female bodies ought to be 'aligned' (Van Anders, 2015). Incidence estimates vary, because different physical characteristics such as genetics and anatomy have been given different weight in grounding the category (D.A. Griffiths, 2018a), experts and communities disagree about which umbrella terms are useful (Delimata et al., 2018; Lundberg et al., 2018), and the dynamics of stigma inhibit easy disclosure. Estimates range from 0.05–.7% in the United Nations (Munro, Crocetti, Yeadon-Lee, Garland, & Travis, 2017). This research is about lay people's understanding of intersex and attitudes towards its medicalisation. We first introduce the history of this medicalisation, and then motivate our investigation of the social psychology of its public understanding.

Historical introduction

The medicalisation of intersex variations is continuing and controversial. Surgery to normalise intersex bodies within a gender/sex binary has been ongoing since at least the 19th century (Dreger, 1998), shaped by scientific homophobia since the emergence of sexology (Reis, 2009), and shaped by cisgenderism since at least the mid 20th century (D. A. Griffiths, 2018b).

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Psychologists accelerated the instrumental use of intersex lives as ‘natural experiments’ to answer nature/nurture questions about sexuality from the mid-20th century onward (see Ellis, 1948; Money & Ehrhardt, 1972). Surgical interventions prior to the age of 18 months were deemed beneficial by medical protocols developed by psychologist John Money in the mid-1950s. These rationales for surgery were *psychological*, and included aligning physical sex to gender role and identity, and the related goal of enabling parent-child bonding (see Gill-Peterson, 2018; Morland, 2015). Sexologist Meyer-Bahlburg (1998) coined the term ‘the optimal gender policy’ to describe Money’s protocol. Since the 1990s, medicalisation has been protested by intersex rights groups and their allies (Chase, 1998; Crocetti et al., 2020; Davis, 2015). The 2005 Chicago consensus statement was the principle medical response to these controversies in recent times. It acknowledged harms of some surgeries, significant gaps in knowledge, emphasised that the overall aim of clinical medicine was societal adjustment, aimed for a new classification system grounded in genetics, and introduced the neologism *disorders of sex development*, or *dsd*, as a new umbrella term in this area (Lee et al., 2006). The Chicago consensus statement has diversified collaborative and oppositional relationships between advocacy groups and medicine (see Carpenter, 2018; Crocetti et al., 2020; Davis, 2015).

In the past decade, international human rights bodies have targeted non-essential medical interventions performed for socially normalising reasons as human rights abuses (e.g., Amnesty International, 2017; Council of Europe Commissioner for Human Rights, 2015; European Union Agency for Fundamental Rights, 2015; Human Rights Watch, 2017; United Nations, General Assembly, Human Rights Council, 2013). Their central concern is with irreversible surgeries on children too young to provide informed consent, and their rights to bodily integrity and future self-determination (Carpenter, 2016). The current medical consensus is that surgeries on intersex variations are done not only for reasons of medical necessity, but also to foster the development of individual and social identities, avoid stigmatisation, and to respond to parents’ desire for the best possible conditions for their children (Mouriquand et al., 2016, p. 142). In sum, interventions have psychosocial rationales which are endorsed by medical authority. Medical professionals are aware that their interventions are controversial (Liao et al., 2019), and reductions of surgeries in at least one hospital have been attributed to an influence of patient advocacy (Schoer et al., 2018). However, the national trend in the UK NHS has been towards only a small change in the rates of vaginoplasty and no change in rates of clitoral surgery over time (Michala et al., 2014, see also Carpenter, 2018, on static trends in Australia).

The social psychology of medicalising intersex

We assess lay people’s understanding in this research because medical intervention has the ultimate goal of social acceptance (Lee et al., 2006), but research on public understandings of intersex have been sorely lacking (see Liao & Simmonds, 2014 for a call for such research). We build on a small body of work showing that intersex can be differently *framed* as medical or non-medical by advocates (Crocetti et al., 2020) and lay people who first learn about the topic in focus groups (Lundberg et al., 2019). Stigmatised characteristics (a) can be framed as something physical to be concealed or ‘fixed’, as a basis for identity pride, or as something that engender token representation (Goffman, 1963; Tajfel, 1978). Stigma framing affects medical decision making about physical characteristics in other domains such as short stature (e.g., Fernández et al., 2012). Psychologists who study sexuality understand that the dominant framing of stigma can shift in a culture, as happened with homosexuality, for example, (Hegarty, 2018). Intersex-identified people in the USA in the 1990s formed a social identity framework that seemed to resemble LGBT identities to the sociologists who first studied it (see Preves, 2003).

Situational linguistic framing can also affect people’s opinions and decisions about medical interventions on intersex characteristics. Trainee doctors who made hypothetical surgery decisions about a child born with intersex characteristics, mostly elected for surgery when the case was framed in medical terms, but not when it was framed in psychosocial terms (Streuli et al., 2013). UK

students' who watched *YouTube* videos featuring first-person accounts of people with intersex characteristics preferred a video with the social identity frame than one with a medical frame, and their beliefs about the beneficence of medical interventions were affected by whichever video they watched (Hegarty, Bogan-Carey, & Smith, 2019). Smith and Hegarty (2020) measured participants' opinions that genital cutting of infants described either as 'female' or 'intersex' infringed human rights. Cutting on 'intersex' children was tolerated to a greater extent, particularly among participants who trusted medical authority the most. In sum, lay people seem to be able to conceptualise intersex in more than one frame, and frames can be suggested by the situation in which intervention is presented.

A recent survey adds to this picture by showing how the preferred framing of intersex (as medical vs. social) is unevenly distributed in the USA and UK public (Hegarty, Donnelly, Dutton, Gillingham, Williams & Vecchiotti, 2020). Heterosexual participants were more supportive of early medical interventions, whilst LGB+-identified participants (i.e., sexual minority participants) were more supportive of non-medical social responses, including supportive parenting, support groups, human rights limits on medical intervention and social equality for intersex people. No other demographic characteristic – including gender, nationality and parenting status – consistently predicted attitudes about all of these possible responses to people with intersex characteristics in this survey. Much of this sexual orientation difference was explained by group differences in political orientation, right-wing authoritarianism, and beliefs in a binary understanding of gender.

The current study both tested the replicability of this sexual orientation difference in opinions, and investigated further its relationship to heteronormative ideology. Third, we examined participants' unique analogies and associations to real segments of research interview with a health professional, parent and adult intersex person to examine the *formation* of attitudes and public understanding upon learning about intersex.

The present study

The difference of opinion by sexual orientation and the correlation between gender binary beliefs and opinions about the medicalisation of intersex prompt further thinking about *heteronormativity*. Because queer people face a variety of oppressions, *heteronormativity* has taken on several meanings in the academic literature since it emerged from queer theory in the early 1990s (Jagose, 1996; Turner, 2000). Marchia and Sommer (2019) described four meanings of *heteronormativity* in academic work; (1) the erasure and othering of non-heterosexual sexualities (following Seidman, 1991; Warner, 1991); (2) the patriarchal policing of gender socialisation (indebted to Rich, 1980); (3) the unstable idealisation of masculine and feminine gender roles that renders queer subjects non-normative (following Butler, 1990); and (4) the interlocked patriarchal policing of gender and sexuality categories (following Rubin, 1984). These diverse understandings are all potentially relevant to intersex. For example, the erasure and othering of non-heterosexuality is evident in clinical care that addresses sexual function by focusing on the physical capacities of bodies to enact penetrative heterosexual intercourse, without concern for any other sexual practices, or the impact of medicalisation on sexual experience (Roen et al., 2018). Patriarchal policing is evident because genital surgeries conducted in infancy aim to remove the risk of bullying, locating the problem of bullying in the body of the intersex child rather than the social dynamics of bullying (Morland, 2001).

We examined four beliefs relevant to heteronormative ideologies here. First, we measured social identity (Tajfel & Turner, 1986). LGBT organisations' support for intersex human rights has been critiqued as imposing an inappropriate identity framework on intersex with harmful effects. On the one hand, some members of the medical profession and some advocacy groups have described LGBT groups as undermining relationships between parents and medical professionals in general (Cools et al., 2016). On the other, some human rights critics have described the inclusion of intersex issues in the platforms of LGBT groups as largely rhetorical and lacking in an understanding of intersex issues (Carpenter, 2018, p. 496). These different critiques both suggest the possibility that LGB+-identified people's opinions in favour of the de-medicalisation of intersex may be problematic

expressions of their strong (sexual orientation) social identities. We also examined heterosexual social identity here.

Second, we examined *heterosexual complementarity*, a component of benevolent sexism in Glick and Fiske (1996) theory of ambivalent sexism. Within ambivalent sexism theory, benevolent sexism is the component that includes positive stereotypes of women and often appears non-sexist (Hopkins-Doyle et al., 2019). Glick and Fiske (1996) described heterosexuality as central to benevolent sexism because both intimacy and violence between women and men characterise heterosexuality. Consequently, idealising or naturalising heterosexual intimacy as gender complementarity can obscure forms of sexism that women do experience. Because the clinical management of intersex often presumes that sex and relationships are heterosexual, we predicted that endorsing heterosexual complementarity would predict support for medicalising of intersex.

Third, we measured empathy. Empathy and perspective-taking interventions are promising ways of reducing prejudice against sexual and gender minorities (Bartoş et al., 2014; Cramwinckel et al., 2018). We expected that LGB+ people would be more empathic than their heterosexual counterparts, and that empathy would be associated with rejecting medicalisation.

Finally, we measured gender binary beliefs. The purpose of intervening on medical intersex has long been argued to depend upon the gender binary (Roen, 2004). Tee and Hegarty (2006) developed a measure of belief in two and only two genders that are defined by sex characteristics. Two recent studies found gender binary beliefs to predict support for genital surgery on intersex characteristics (Hegarty et al., 2020, 2019). We expected to replicate those findings here.

In the second part of the study we examined analogies to intersex that came to mind when participants read interview transcripts extracted from an award-winning sociology book (Davis, 2015). Education about intersex has been critiqued for instrumentalizing intersex to illustrate social constructionist theory to the exclusion of real people's voices (Koyama & Weasel, 2001). By using Davis' (2015) interviewees we hoped to bypass this criticism.

Not all members of the public have heard the term 'intersex' or cognate terms (Hegarty et al., 2020) and the ideas that diverse perspectives on intersex bring to mind for lay people have not been studied. Analogical and metaphorical thinking can create new associations and meanings for unfamiliar concepts (Glucksberg, 2003). Such initial analogies to unfamiliar scientific topics can begin the formation of attitudes about them (see Marcu et al., 2015). Analogies can also steer people's political orientations to uncertainties in the present (Ghiliani et al., 2017). Accordingly, we aimed to assess how much and what kind of analogies participants constructed when they *learned more* about intersex via Davis (2015) interviewees.

Methods

Participants

120 UK users of the online site *Prolific* took part, including 66 women, 51 men, and 3 people with non-binary gender identities (age = 18–61 years, $M = 31.15$ years, $SD = 10.75$ years). Sexual orientation was inferred from Prolific users' profiles as heterosexual ($n = 61$) or LGB+ ($n = 59$). Users complete these profiles by answering such demographic questions such as 'What is your sexual orientation? *Heterosexual, homosexual, bisexual, asexual, or other.*' Participants had identified as heterosexual ($n = 61$) or as *homosexual, bisexual, asexual* (LGB+) ($n = 59$). Participants were paid £3 each.

Materials

Opinions about medicalisation. Participants first read a short *Survey Briefing* introducing intersex characteristics and controversial medical interventions on those characteristics, justifying the term

'people with intersex characteristics' to be used throughout the survey. (see Appendix). Next, participants completed eight 7-point items measuring opinions about medical interventions on intersex characteristics used by Hegarty et al. (2020). Scales ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). (e.g., '*Medical procedures, such as surgery, are in the best interests of children with intersex characteristics*'). Items were reverse coded where appropriate and averaged to form a reliable scale (Cronbach's $\alpha = .77$). Higher scores indicated greater support for early medical intervention.

Opinions about legal limitation. Participants then read an *Introduction to the Legal Debate* around medical interventions (see Appendix). They completed eight 7-point items used by Hegarty et al. (2020) to measure *Support for Legal Limitations* (e.g., '*Irreversible treatments that are not medically necessary must be prohibited by law until the individual has the capacity to consent to those treatments themselves*'). Scales ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were reverse coded and averaged to form a reliable scale (Cronbach's $\alpha = .86$) with higher scores indicating greater support for legal limitation of medical intervention.

Analogies to intersex. Third, participants read three passages from interviews as cited in Davis (2015) from a medical professional, a parent of a teenager with intersex characteristics, and an adult with intersex characteristics (See Appendix). They were asked to generate analogies:

When people hear something about something new or unfamiliar it can bring to mind things that have happened in their life, the lives of people they know, or people they have heard or read about. These thoughts are comparisons that we make which in this study we will call *analogies*. Based on the passages you read above, please write down up to three analogies that come to your mind.

Three blank spaces followed. Next, participants were instructed to select the *strongest* analogy: ('*Based on your answers, which of your analogies do you feel is the strongest? Please choose according to your opinion only, as there is no correct or incorrect rating or analogy*'). Finally, participants were asked to explain: ('*Why do you feel that analogy is strongest?*') A blank space for their answer followed.

Four psychological variables were next measured.

Empathy. Empathy was measured using the 16-item Toronto Empathy Questionnaire (Spreng et al., 2009) including such items as '*I can tell when others are sad even when they do not say anything*'. Participants responded using 5-point scales ranging from 0 (*Never*) to 4 (*Always*). Appropriate items were reverse coded and averaged to form a reliable measure (Cronbach's $\alpha = .86$) with higher scores indicating greater empathy.

Social identity. Social Identity was measured using five 7-point items from Morton and Postmes (2009) measure. These items were developed for an LGB sample but we adapted then to refer to sexual orientation here (e.g., '*Being gay is an important part of who I am*'. Was adapted to '*My sexual orientation is an important part of who I am*'). Scales ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Items were reverse coded and averaged to form a reliable measure (Cronbach's $\alpha = .82$) with higher scores indicating greater identification with the relevant sexual orientation identity.

Heterosexual complementarity. Heterosexual Complementarity refers to the belief that women and men are not complete without heterosexual intimacy with each other. Heterosexual complementarity was measured with four items from Glick and Fiske's Ambivalent Sexism Inventory (Glick & Fiske, 1996) (e.g., '*No matter how accomplished he is, a man is not truly complete as a person unless he has the love of a woman*'). Scales ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Items were reverse coded and averaged to form a reliable measure (Cronbach's $\alpha = .82$) with higher scores indicating greater idealisation of heterosexual complementarity.

Gender binary beliefs. Gender Binary was measured using the nine 7-point items of Tee and Hegarty (2006) scale (e.g., 'All males have a penis and females all have a vagina'). Scales ranged from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Items were reverse coded and averaged to form a reliable measure (Cronbach's $\alpha = .83$) with higher scores indicating greater belief in a gender binary.

Procedure. The study received ethical approval from a University Ethics Committee. After giving consent, participants completed the measures as described in above. After finishing the survey, participants were given a debrief including direction to websites and support groups and the researchers' contact information.

Results

Preliminary analysis

Missing data were rare. Four participants omitted one question, and one omitted three items. These participants' mean scores were calculated from the items completed on the relevant measures. All variables were normally distributed, and only four outliers were found across the measures, whose inclusion did not violate normality. Their data were included in the parametric analysis below.

Sexual orientation differences

We first investigated differences in opinions about intersex by sexual orientation. Independent t-tests confirmed that heterosexual participants supported medical intervention significantly more than LGB+ participants ($M = 4.31, 3.50, SD = .81, .86$ respectively), $t(118) = 5.29, p < .001, d = .97$, and supported legal limitations on medical intervention significantly less than LGB+ participants ($M = 4.80, M = 5.67, SD = 1.13, .93$ respectively), $t(118) = -4.56, p < .001, d = .84$. These differences replicate Hegarty et al.'s (2020) findings. The 51 men endorsed medical intervention more than the 66 women ($Ms = 4.04, 3.88, SD = .82, .98$, respectively) and endorsed legal limitations less ($Ms = 5.09, 5.28, SD = 1.19, 1.06$ respectively), but neither gender difference approached significance, both $|t| < 1$. The three non-binary participants did not endorse medical intervention ($M = 2.71, SD = .56$) but did endorse its legal limitation ($M = 6.29, SD = .69$).

Next, we investigated sexual orientation differences in the four psychological measures. LGB+ participants' social identification was more variable than heterosexual participants' identification ($SD = 1.29, 1.01$), Levene's test, $F(1, 118) = 4.83, p = .030$. Degrees of freedom for the t-test were adjusted, and heterosexual and LGB+ participants did not differ in strength of sexual orientation social identity ($M = 4.89, 5.03$), $t(110) = -0.64, p = .53$. Second, heterosexual identified participants valued heterosexual complementarity more than LGB+ participants did ($M = 3.20, 2.06, SD = 1.34, 1.04$), $t(118) = 5.20, p < .001, d = .95$. Third, as predicted, LGB+ participants were significantly more empathetic than heterosexual participants ($M = 3.06, 2.83, SD = 0.42, 0.55$), $t(118) = -2.54, p = .013, d = .46$. Finally, heterosexual identified participants endorsed gender binary beliefs significantly more than LGB+ participants did ($M = 3.50, 2.57, SD = 1.25, 1.00$), $t(118) = 4.48, p < .001, d = .82$.

Correlations

We measured four psychological variables to better understand the sexual orientation difference in opinions about intersex. Correlation between these psychological variables and opinions about medical intervention and its legal limitation are shown in (Table 1). Opinions about medical intervention and its legal limitation were strongly negatively correlated and predicted by gender binary beliefs, as in Hegarty et al. (2020). Heterosexual complementarity was significantly positively correlated with opinions about medical intervention in both groups and opinions about legal limitation

Table 1. Correlations between opinions and psychological measures by participant sexual orientation.

	1	2	3	4	5	6
1. Medical Intervention		-.62**	.42**	-.21	.38**	-.21
2. Legal Limitation	-.70**		-.53**	-.05	-.45**	.24
3. Gender Binary	.42**	-.40**		-.21	.51**	-.37**
4. Social Identity	.42**	-.29*	.30*		.07	.15
5. Complimentarity	.25*	-.18	.30*	.49**		-.41**
6. Empathy	-.06	.20	-.24	-.03	-.00	

Note. Correlation coefficients for heterosexual-identified participants below the diagonal and LGB+-identified participants above it.

* $p < .05$, ** $p < .01$ (both two-tailed).

among LGB+ participants only. Social identity predicted opinions about medical intervention and its limitation among heterosexual participants only. However, empathy was not significantly correlated with opinions about intersex among either sexual orientation group. Opinions may be motivated less by empathy than beliefs and identities associated with gender, sexuality and sex.

Fisher's Z-test was conducted to examine if any of the eight correlations between two opinion measures and four psychological measures differed by sexual orientation group ($p < .05$). Only the correlation between social identity and endorsement of medical intervention was significantly different across sexual orientation groups, $Z = 3.58$, $p < .001$.

Regression

We calculated two linear regression models to examine which of these variables explained *unique* variance in support for medical intervention and its legal limitation. Sexual orientation (coded as LGB+ = -1 and heterosexual = 1) and all four psychological variables were entered as predictor variables. Because of the significant Fisher's test, we also included the interaction of sexual orientation and social identity as a predictor. Thus, each model had six predictors and sufficient power to detect medium size effects (Field, 2013, p. 314). The product of centred social identity scores and sexual orientation was calculated to provide the interaction term. Sexual orientation and gender binary beliefs remained significant predictors in both models. In addition, the interaction of sexual orientation and social identity predicted significant variance in opinions about medical intervention, but not its legal limitation. In sum, over and above heterosexual status, heterosexual *identification* was associated with support for medical intervention on intersex characteristics (see Table 2).

Analogies

Next, we examined the analogies that participants brought to mind after reading the interview extracts from Davis (2015). The 120 participants generated a total of 298 analogies. Both authors independently categorised these analogies into eleven categories that referenced (1) that nothing came to mind, (2) knowledge about intersex, (3) circumcision, (4) gender minorities, (5) sexual minorities, (6) medicalised contexts, (7) parents' agency, (8) choice and coercion, (9) harm and

Table 2. Regression models predicting support for medical intervention and its legal limitation.

Predicted Variable	Support for Medical Intervention				Support for Legal Limitations on Medicine			
	Estimate	SE	t	p	Estimate	SE	t	p
Sexuality	.249	.080	3.12	.002	-.215	.099	-2.16	.033
Gender Binary Beliefs	.230	.068	3.37	.001	-.344	.085	-4.05	<.001
Empathy	.009	.147	0.06	.953	.207	.182	1.13	.260
Complementarity	.088	.066	1.34	.183	-.074	.082	-0.91	.365
Social Identity	.044	.065	0.67	.502	-.120	.081	-1.49	.139
Social Identity x Sexuality	.154	.064	2.39	.018	-.023	.080	-.290	.773

$F(6, 113) = 11.71$, $p < .001$, adjusted $R^2 = .351$

$F(6, 113) = 10.29$, $p < .001$, adjusted $R^2 = .319$

Table 3. Categories and examples of 298 analogies to intersex.

1. Nothing Came to Mind (n = 14, %Tot = 4.7%, %Best = 10%)	No analogy comes to mind here, have no connection to this.
2. Knowledge about Intersex (n = 25, %Tot = 8.4%, %Best = 9.2%)	I think there was quite a big news story recently about an intersex supermodel. My cousin's child was born intersex and she is having to make the decision about the child's future.
3. Circumcision (n = 24, %Tot = 8.1%, %Best = 14.2%)	The fixing of the foreskin of my son after birth and the recommendation of circumcision as a possible solution. It reminds me of cases of female genital mutilation on the news.
4. Gender Minorities (n = 28, %Tot = 9.4%, %Best = 10.8%)	A girl in my primary school was transgender and now sees herself as male. My son is transgender, so it made me think of how he would have loved to be born with a large clitoris as he would be part way there for his own surgery.
5. Sexual Minorities (n = 11, %Tot = 3.7%, %Best = 4.2%)	Reading about the lives of gay people who in the past were forced to undergo 'treatment' to 'cure Them.' People suffered severe psychological damage from this treatment. Labelling people as dsd, gay, lesbian, trans etc. will never help to cause. Normalising 'the look' is not the solution but normalising the perception is.
6. Medicalised Contexts (n = 72, %Tot = 24.2%, %Best = 15.0%)	We trust the medical profession to help us make the right decisions but it's not always for our benefit. The medical team can't give back what they've taken from me.
7. Parents' Agency (n = 43, %Tot = 14.4%, %Best = 14.2%)	How can the parents accept or refuse the surgery on their children? Thoughts of how as a parent I would feel if my own child was intersex.
8. Choice and Coercion (n = 29, %Tot = 9.7%, %Best = 8.3%)	A decision was made for yourself without having any say. It is like being forced to cut off a finger or an ear or another part of the body without consent and for no good reason.
9. Harm and Abuse (n = 12, %Tot = 4.0%, %Best = 5.0%)	The passage written by the intersex individual reminds me of victims of other bodily violations, particularly sexual assault or abuse. In women's lives rape, violence, coercive control.
10. Varied Embodiment (n = 16, %Tot = 4.4%, %Best = 3.3%)	An albino baby is born to African parents. The village decides to ostracise the child. Myself growing to like parts of my body I had disliked as a child.
11. Non-Classifiable (n = 24, %Tot = 8.1%, %Best = 5.8%)	Can animals experience this type of condition? Hindsight is a wonderful thing.

Note: n = Count of Analogies, %Tot = Percentage of All Analogies Generated, %Best = Percentage of Participants Who Chose Analogies in Each Class as Best.

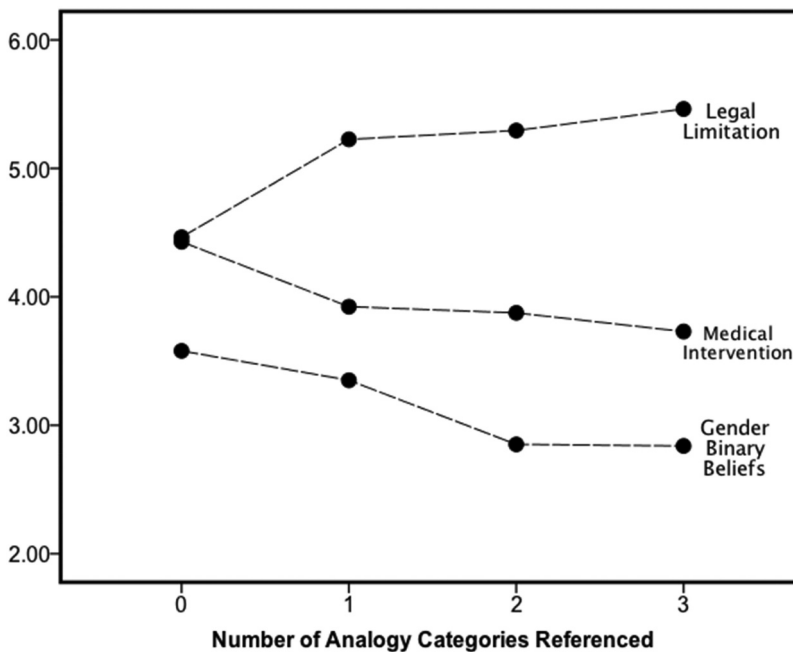


Figure 1. Gender binary beliefs and support for medical intervention and its legal limitation by number of analogy categories referenced.

abuse, (10) varied embodiment, and (11) non-classifiable responses. We generated the categories by grouping the analogies along the lines of recurring themes. The coders agreed on 275 cases (92.3%), kappa = .913, and resolved disagreements by discussion. The number and percentage of analogies in each category are shown in (Table 3), along with some illustrative examples of participants' analogies.

For each participant, we calculated the total number of distinct categories represented across the three analogies that they generated. For this analysis, we grouped responses about categories 4 and 5 (i.e., sexual and gender minorities) and categories 8–10 (choice, harm, and embodiment) into single categories representing *LGBT+-related responses*, and *remote associations*, as there were relatively few analogies in these semantically related categories. Six variables were created to represent whether each participant produced an analogy in each of the six categories (coded as 1 if present and 0 if absent). Twelve chi-square tests showed that there were no significant associations between the presence or absence of analogies in any of these six individual categories and either participants' sexual orientation, all $\chi^2 < .14$, all $p > .28$, or cisgender participants' gender, all $\chi^2 < .20$, all $p > .21$. We also calculated the 36 correlations between the four psychological measures and two opinion scores and the presence or absence of the six analogies. By chance alone, two of these correlations should reach conventional significance. Here, participants who endorsed gender beliefs more were less likely to generate analogies about circumcision, $r(119) = -.218$, $p = .02$ and participants who supported medical interventions more were less likely to generate analogies about LGBT+ people, $r(119) = -.225$, $p = .01$. The other 34 correlations did not reach the .05 conventional threshold for statistical significance. We concluded that there were no robust relationships between psychological variables and the production of particular analogies.

We next considered the *breadth* of participants' analogical thinking. Each participant generated analogies that could be categorised into a total of either 0 ($n = 14$), 1 ($n = 26$), 2 ($n = 50$), or 3 ($n = 30$) of the six analogy categories. By calculating this figure for each participant, we developed a 4-point measure of the *breadth* of analogical thinking for each participant that was based on the

categorisation of the analogies. This measure was not significantly correlated with heterosexual complementarity beliefs, social identity, or empathy, all $|r| < .12$, all $p > .20$. LGB+ and heterosexual participants generated similarly broad ranges of analogies ($M_s = 1.88, 1.72$ analogies, $SD = .97, .93$ respectively), as did women and men, ($M_s = 1.82, 1.76$ analogies, $SD = .97, .94$ respectively), both $|t| < 1$. The three non-binary gender participants produced analogies in 1, 2, and 3 domains

However, participants' opinions about medicalising intersex were systematically related to the breadth of their analogical thinking upon reading the interview extracts. Participants who generated a broader range of analogies held significantly more negative opinions about medical interventions, $r(119) = -.19, p = .03$, and also held significantly more positive opinions about legal limitation, $r(119) = .22, p = .01$. Participants who generated a broader range of analogies endorsed the gender binary less, $r(119) = -.21, p = .02$. These trends are shown in (Figure 1).

Finally, participants' *strongest* analogy, reflected their more deliberative judgements of which analogy was best. Twelve participants did not complete this item and the remaining 108 were equally likely to designate their best analogy as the one that they generated first, second or third ($n = 45, 28, 35$, respectively), $\chi^2(2, N = 108) = 4.05, p = .13$. The proportion of best analogies across categories are shown in (Table 3) and were similar to the overall distribution of analogies across categories. Deliberation did not lead the participants to particularly favour one domain over others.

Discussion

The present study adds to research on the public understanding of the medicalisation of intersex. It replicated earlier findings that heterosexual-identified lay people and lay people who believe in the gender binary are more tolerant of controversial medical interventions on children with intersex characteristics. Two other psychological variables that are conceptually related to heteronormativity, heterosexual complementarity and heterosexual social identity, were also predictive of support for medicalisation. The study also points how public opinions are formed, as the breadth of participants' analogical thinking about intersex rather than the particular content of their analogies predicted their opposition to medicalisation and to the gender binary belief system.

This study is hard to reconcile with some plausible hypotheses about the reasons for the sexual orientation difference in opinions that we aired in the introduction. LGB+ people were not more likely to think of intersex as analogous to LGBT+ issues than heterosexual people were. Also, strength of social identity among LGB+ participants was unrelated to opinions about medicalisation. Therefore it seems that there is no reason for concern that lay LGB+ people's inappropriately imposed their social identities when understanding intersex. In contrast, identifying with *heterosexual* identities and communities predicts support for the ongoing medicalisation of intersex, over and above the effect of both sexual orientation itself and the effect of believing in the gender binary.

Heterosexual people are routinely conflated with general categories such as 'the public' or "society" in heteronormative ideologies (Warner, 1991). Focusing on LGB+ people's difference from heterosexual people has also been described as evidence of heterosexist bias in research (Herek et al., 1991), and of cultural heterosexism (Herek, 2007). Such asymmetric explanations are spontaneous, rooted in defaults derived from groups such as heterosexuals' higher status, and these explanations legitimate continuing power inequalities between groups (e.g., Bruckmüller & Abele, 2010; Hegarty et al., 2020). By shifting the 'effect to be explained' from LGB+ identity to heterosexual orientation, this study contributes to undoing heteronormativity in the framing of public understanding of intersex and its medicalisation. Most people who are demanded to care for children with intersex characteristics and to navigate difficult medical decisions to represent those children's best interests are heterosexual.

We found no relationship between empathy and opinions here, and participants' analogies may help to explain why the relationship between empathy and public attitudes to the medicalisation of intersex. Several participants made analogies to parents' experiences and to medicalisation, which showed that they empathised with those entrusted with difficult decisions to make about children

with intersex characteristics (e.g., *Parents also need to make medical decisions on behalf of their children in terms of vaccinations, where it's clearly in the child's interest to be immunised*). The relationship between empathy and opinions about medicalisation may be complex because lay people can empathise with people who are differently positioned in these kinds of contexts. We also found heterosexual complementarity was correlated with opinions, but that it did not predict unique variance in opinions. This finding may have been observed because *heterosexual complementarity* refers to romantic relationships, which has a conceptual relationship to sex, but one which is moderated by the influence of other variables measured here.

The most original finding in this paper is the one linking breadth of analogical thinking to opinions about medicalisation and the gender binary. To make sense of unfamiliar domains that are mystified by technical scientific language, lay people *anchor* their social representations in more familiar concepts (Marcu et al., 2015). The diversity and unpredictability of participants' analogies suggest that the two stigma frames studied here are not the only possibilities; lay people can make sense of intersex in many other frameworks (see also Carpenter, 2018, regarding models drawn from disability studies). For example, learning about intersex might call to mind a person's own experiences of healthcare, LGBT people that they know, or their own experiences of parenting or being parented (see Table 3). Ordinary people have the capacity to frame others' unfamiliar experiences through diverse analogies.

Whilst we could not predict lay people's opinions from the *direction* of their immediate analogical thinking, participants who produced more diverse analogies were more opposed to its medicalisation. We venture that that finding may have occurred because the medical framework of intersex is the *dominant* one. Indeed, analogies to medicalised contexts were the modal responses here (see Table 3). Diverse analogies may evidence thinking 'outside the box' of this medical framework, and two recent studies also suggest this possibility. In one, belief in the authority of medicine predicted greater support for surgery on children who were labelled 'intersex' rather than 'female' (Smith & Hegarty, 2020). In another, openness to influence by first-person narratives of intersex people was predicted by opposition to the gender binary (Hegarty et al., 2019). If this interpretation is correct, then lay people's capacity to think about intersex in more than one frame of reference may have some clinical implications. In the DSD clinic, it is a common experience for parents and patients to want more time to slow down and *formulate* questions to ask medical professionals in healthcare (Roen, 2019). The present study suggests that if time were allowed to conceptualise and formulate questions that lay people might also come to more fully conceptualise intersex characteristics, and to make more grounded decisions. In this regard it is disappointing that, even when new decision aids are developed, that they are not readily adopted in clinical practice (Sandberg et al., 2019). We hope the present study informs clinical discussions about the kinds of public understanding of intersex characteristics that already exist, and the process by which laypeople formulate opinions that are the basis of decisions about available medical interventions in this area.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

Survey Briefing

Thank you for participating in this survey. In this first part, you will learn about people who are born intersex and we will ask you for your opinions about them. Many of the opinion statements are drawn and adapted from news articles, research reports and policy statements. These quotes are not the researchers' opinions, nor are they factual; not all experts agree on all issues in this domain. We are interested in your opinions on these issues, whether you have learned about them before or are just learning about them for the first time here.

A person's biological sex includes their genitalia, genetic chromosomes, hormones and other factors. People are born with diverse combinations of these sex characteristics. Moreover, genitalia, genetic chromosomes, and hormones all differ in ways that often do not match the exact norms in our society for males or for females. We will use the term 'people with intersex characteristics' as an umbrella term to refer to people with such sex characteristics for the remainder of the survey.

In the next screen you will be told more about what happens when a child is born with intersex characteristics and we will ask your opinions about some options for the treatment of such children. Please report your opinions as truthfully and as completely as you can.

Some new-born babies have intersex characteristics. Sometimes, a baby's external genitals can be visibly neither typically male nor female at birth. Sometimes, a baby's genitals are clearly male or clearly female, but further tests reveal unexpected hormonal or genetic patterns. Sometimes, a child's intersex characteristics are only evident later on, when

they reach puberty, for example. In some cases, surgery is performed in this country on babies and older children with intersex characteristics. In the past, such surgery was performed with the aim of improving parent-child bonding by making a child's genital appearance more normal, even though there is little evidence that surgery had this psychological benefit. For these reasons, there is considerable debate about whether these surgeries should be performed now. In this country, surgery can only be legally performed on children with intersex characteristics with their parents' or guardians' consent. We would now like to ask you your opinion about the medical treatment of children with intersex characteristics.

Introduction to the Legal Debate

In recent generations, a significant number of adults with intersex characteristics have found out suddenly about their condition through asking for their medical records. They often report distress that information was withheld from them. Such people frequently reveal that medical interventions to which they did not consent, and the withholding of records about those interventions have caused them harm. For these reasons, the United Nations is putting increasing pressure on countries – including the UK – to justify its current medical practices. In a few countries, the law now bans some medical interventions on intersex children that are routinely practiced by doctors in your country. The view of some – but not all – leading medical experts is that banning surgery will stop doctors from doing procedures that are in the best interests of children with intersex characteristics.

Passages from Davis (2015). Contesting Intersex.

Dr. Mariam Moshiri, a certified radiologist and professor at the University of Washington, explains how intersex traits are medically approached. Note: In this passage, the term 'Disorders of Sex Development' is used. This is another term for intersex in medical contexts.

'The first step in the management of [Disorders of Sex Development] is sex assignment, which is based on factors such as the genotype; the presence, location, and appearance of reproductive organs; the potential for fertility; and the cultural background and beliefs of the patient's family. The primary goal of sex assignment is to achieve the greatest possible consistency between the patient's assigned sex and his or her gender identity. Once the sex is assigned, the next step in management might be surgery, hormone therapy, or no intervention at all.' (Moshiri et. al 2012, 15,999)

Alexis is a parent of an intersex child. She was faced with deciding whether to allow surgical alteration of her daughter's genitals. The following quote from Alexis is taken from sociologist Georgiann Davis' book, *Contesting Intersex*.

'She said that she agreed to surgery because the doctors assured her it would emotionally benefit her child: "They told me the surgery would fix [her intersex characteristic]. Everything was going to be fine They kind of, like, forced surgery. They would say, "When she gets older, it's going to look funny." You know that I didn't want her to have, you know, it looked like a penis.'"

Morgan Holmes is a scholar and someone with an intersex trait. She shared her personal experience with surgery with sociologist Georgiann Davis:

"It may be that if surgery had not happened when I was young I would have still chosen it. It is equally possible that I would have chosen to keep my big clitoris; the women I know who escaped surgery are quite grateful to have their big clits. That decision should have been mine to make. Without retaining that decision as my personal rights, all other aspects of my sexual health have been severely limited The medical profession can't give back what was taken from me."